

SET 1879 FOLDER 1

PHOTOFACT® Folder

with CIRCUITRACE®

PANASONIC MODEL
CT-909 (Ch. NMX-L2A)

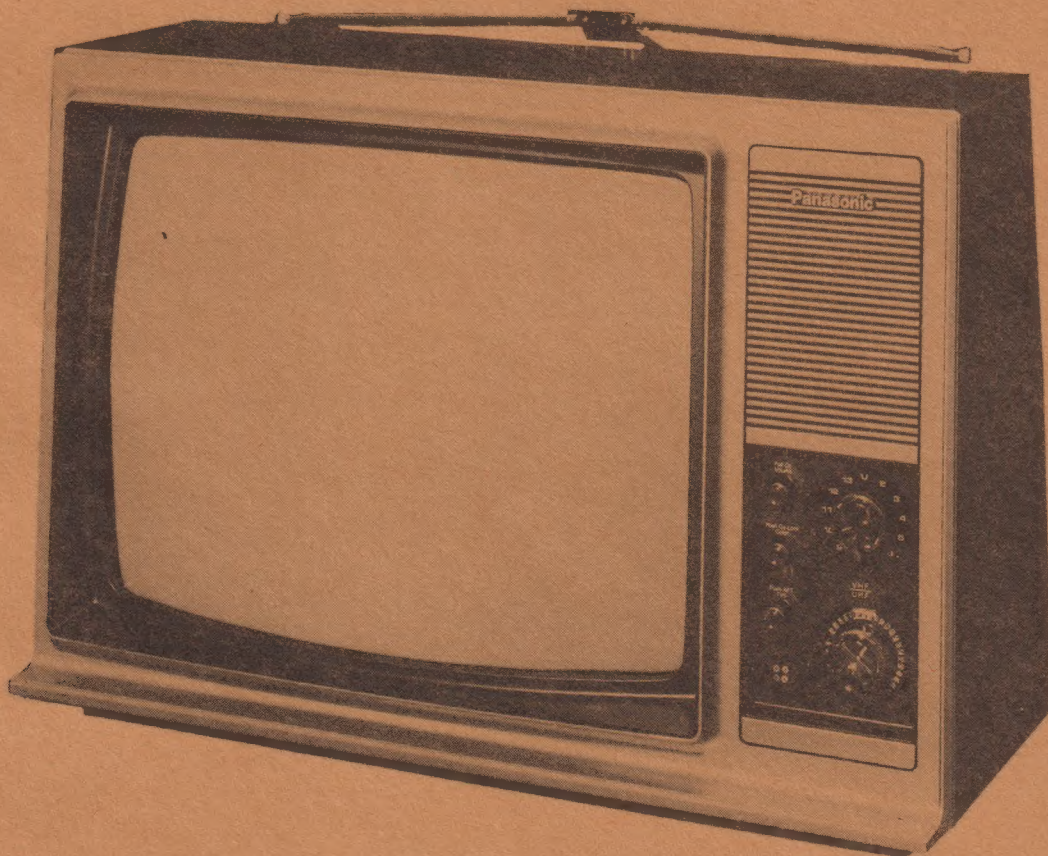
COLOR TV

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of Folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PANASONIC MODEL
CT-909 (Ch. NMX-L2A)



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HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed.

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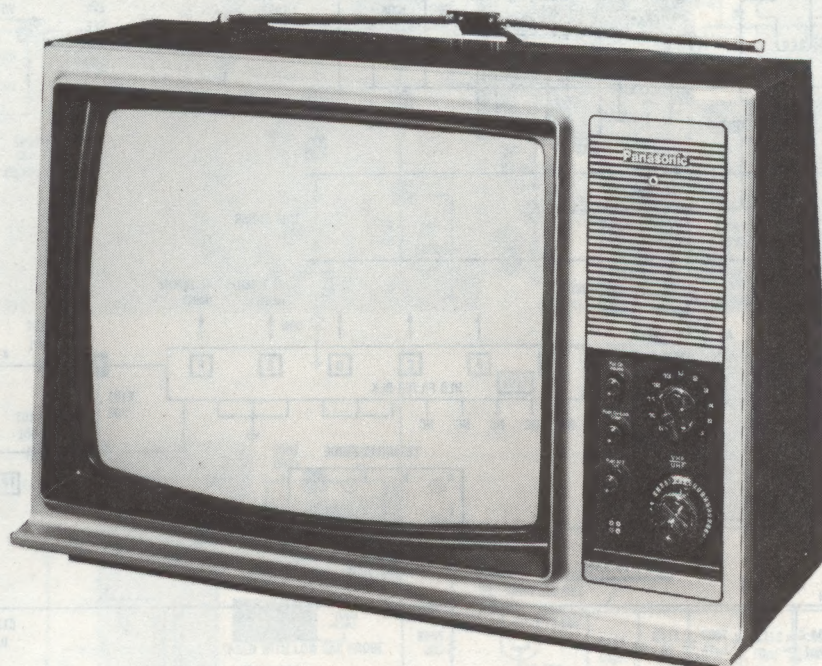
DATE 2-80

SET 1879 FOLDER 1

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For Supplier Address See PHOTOFACT Index

PANASONIC MODEL
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SAFETY PRECAUTIONS

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SERVICE INFORMATION

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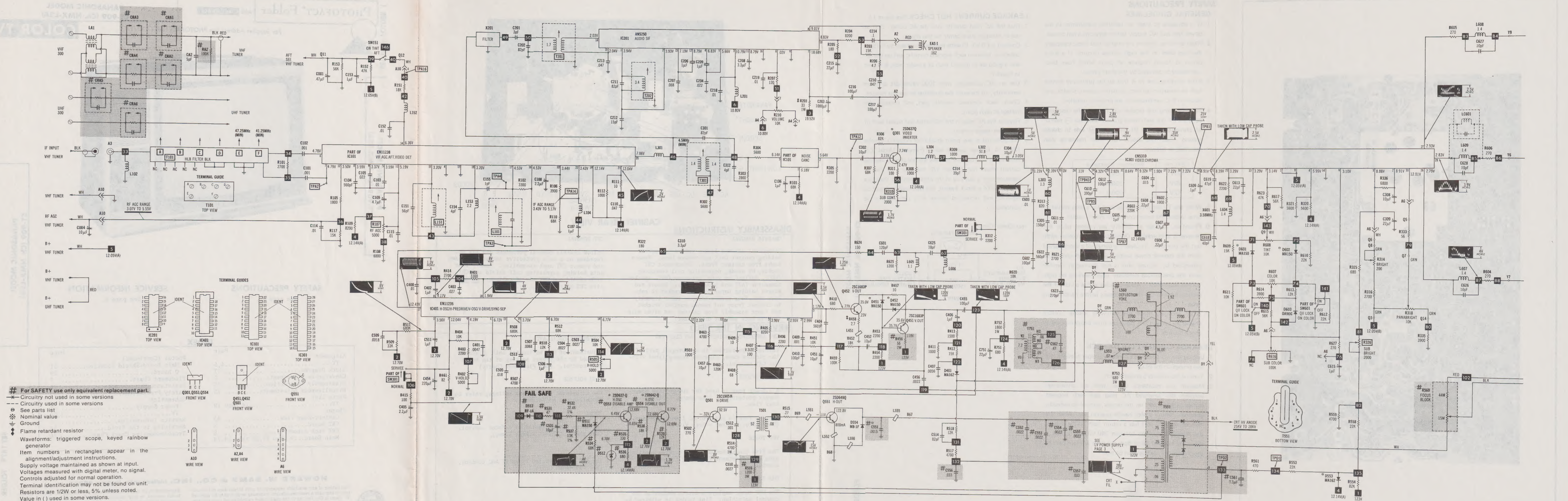
10 9 8 7 6 5 4 3 2 1 0

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DATE 2-80

SET 1879 FOLDER 1





For SAFETY use only equivalent replacement part.
- Circuitry not used in some versions
- Circuitry used in some versions
- See parts list
- Nominal value
- Ground
- Flame retardant resistor
Waveforms: triggered scope, keyed rainbow generator
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured with digital meter, no signal.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are 1/2W or less, 5% unless noted.
Value in () used in some versions.



TV ALIGNMENT INSTRUCTIONS

Use an isolation transformer, or observe polarity, and maintain line voltage at 120VAC. Allow a 20-minute warm-up period for receiver and test equipment.

Suggested Alignment Tools:

GC ELECTRONICS

VHF Tuner IF Output Coil.....9296,9297,9300

L101,L151,T101,T201,T202,T301.....9440

PRELIMINARY INSTRUCTIONS

Set the channel selector to the highest unused channel. Set scope sweep to external. Connect scope vertical input to scope vertical input on sweep/marker generator. Connect scope external horizontal input to scope horizontal input on sweep/marker generator. Ground test equipment to TV chassis unless specified otherwise. Use only enough generator output to provide a usable indication.

Note: Response may vary slightly from that shown.

Connect a +4 volts Bias to TPA14.

Connect a 100 ohm resistor from TPA3 to TPA4.

Set AFT and QII Lock Switches to Off.

VIDEO IF ALIGNMENT

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TPA12	To TP on VHF tuner.	44MHz (10MHz Sweep)	41.25MHz 47.25MHz	Adjust T101(F) for MINIMUM. Adjust T101(E) for MINIMUM. See Figure 1.
"	"	"	41.25MHz 42.17MHz 44.00MHz 45.75MHz 47.25MHz	Adjust VHF Tuner IF Output Coil and T101 (A,B,C,D) for Maximum gain and symmetry of response. T101 (A and D) affects 44.00MHz. T101 (B) affects 42.17MHz and 45.75MHz. T101 (C) affects 45.75MHz. VHF Tuner IF Output Coil affects overall response. See Figure 2.
"	To TPA2	"	45.00MHz 45.75MHz 47.25MHz	Remove 100 ohm resistor from TPA3 and TPA4. Adjust L101 for Maximum gain and symmetry of response with markers as shown. Adjust L151 for notch at peak as shown. See Figure 3.

4.5MHz TRAP ALIGNMENT

Tune in a strong TV signal and set the contrast at maximum. Adjust the fine tuning until a beat pattern is visible on the screen. Adjust T301 for MINIMUM beat interference.

SOUND IF ALIGNMENT

Tune in a station and adjust T201 for maximum sound. Reduce signal strength at the antenna terminals until distortion appears. Continue to reduce the signal while aligning for undistorted output by adjusting T202.

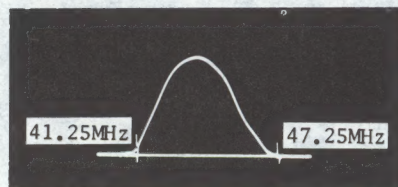


Figure 1

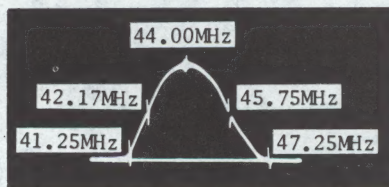


Figure 2

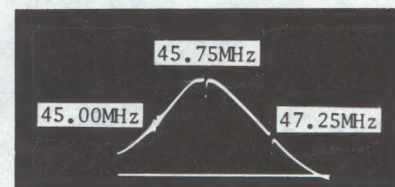


Figure 3

TV ALIGNMENT INSTRUCTIONS (Continued)

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise.				
DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TPA16	To TP on VHF Tuner.	44.00MHz (10MHz Sweep)	45.75MHz	Adjust L151 for Maximum gain and symmetry of response as shown. (See Figure 4.)

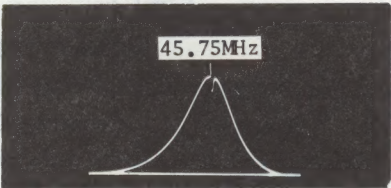


Figure 4

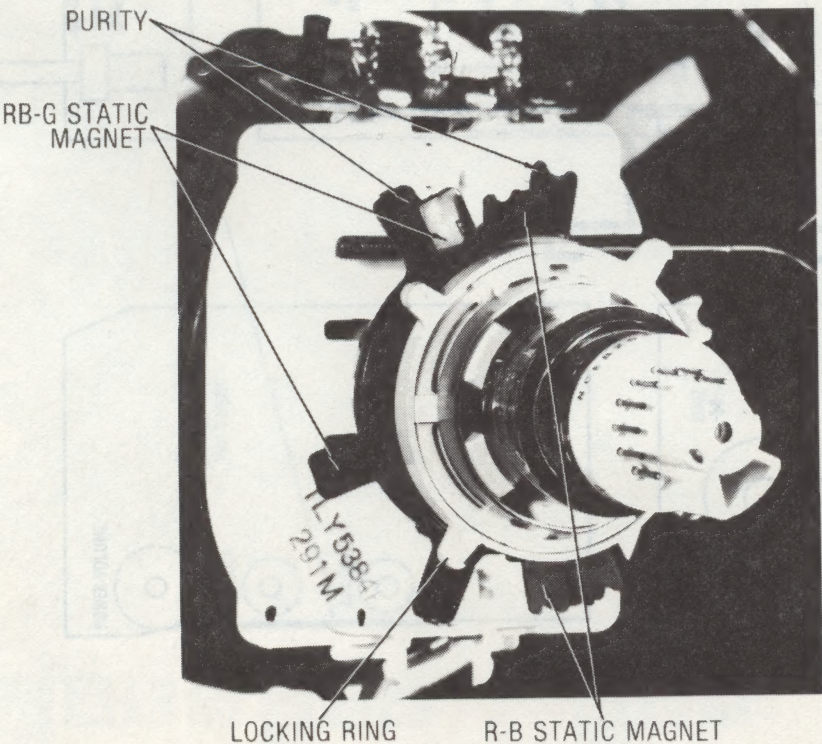
CONVERGENCE ADJUSTMENTS

Miscellaneous Adjustments should be made before proceeding to Convergence Adjustments. Connect dot/crosshatch generator to antenna terminals. Use dot pattern for center dot convergence. Use crosshatch pattern for all other adjustments. View pattern as displayed on TV screen.
NOTE: Maintain center convergence throughout setup procedure.

Perform center dot convergence using convergence magnets.

Adjust convergence magnets to converge red and blue at the center of the screen. Then adjust convergence magnets to converge red and blue with green at the center of the screen.

For overall convergence move yoke vertically, horizontally, or diagonally. Insert the three wedges to hold the yoke firmly in position. Apply adhesive to wedge or place tape over the tab to hold the wedge securely to the CRT.



PANASONIC MODEL
CT-909 (Ch. NM-X-12A)

FOLDER 1
CRT NECK ASSEMBLY

SERVICE INFORMATION

X-RADIATION

- WARNING:** 1. The potential source of X-Radiation in TV set is the High Voltage section and the picture tube.
2. When using a picture tube test jig for service, ensure that jig is capable of handling 29.5KV without causing X-Radiation.

NOTE: It is important to use an accurate periodically calibrated high voltage meter.

1. Turn the Brightness control fully counterclockwise.
2. Set the SERVICE switch to SERVICE.
3. Measure the High Voltage. The upper meter reading should indicate 28KV, +1.5KV -1.5KV. If the upper meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.
4. To prevent an X-Radiation possibility, it is essential to use the specified picture tube.
5. To prevent exposure to X-Radiation, the picture tube shield must be kept in place with power applied to the set.

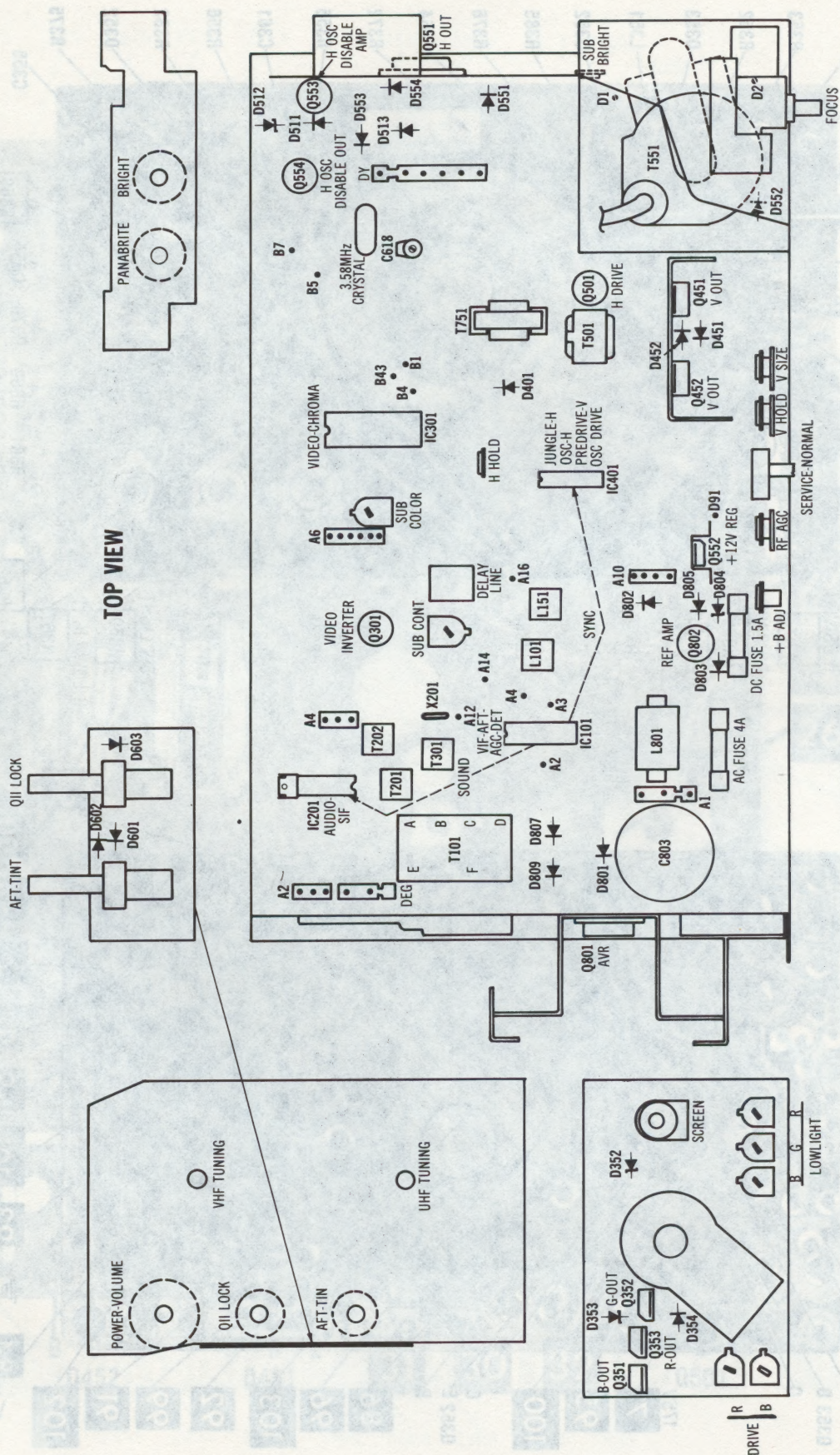
HORIZONTAL OSC. DISABLE CIRCUIT TEST

This test must be made as a final check before the set is returned to the customer.

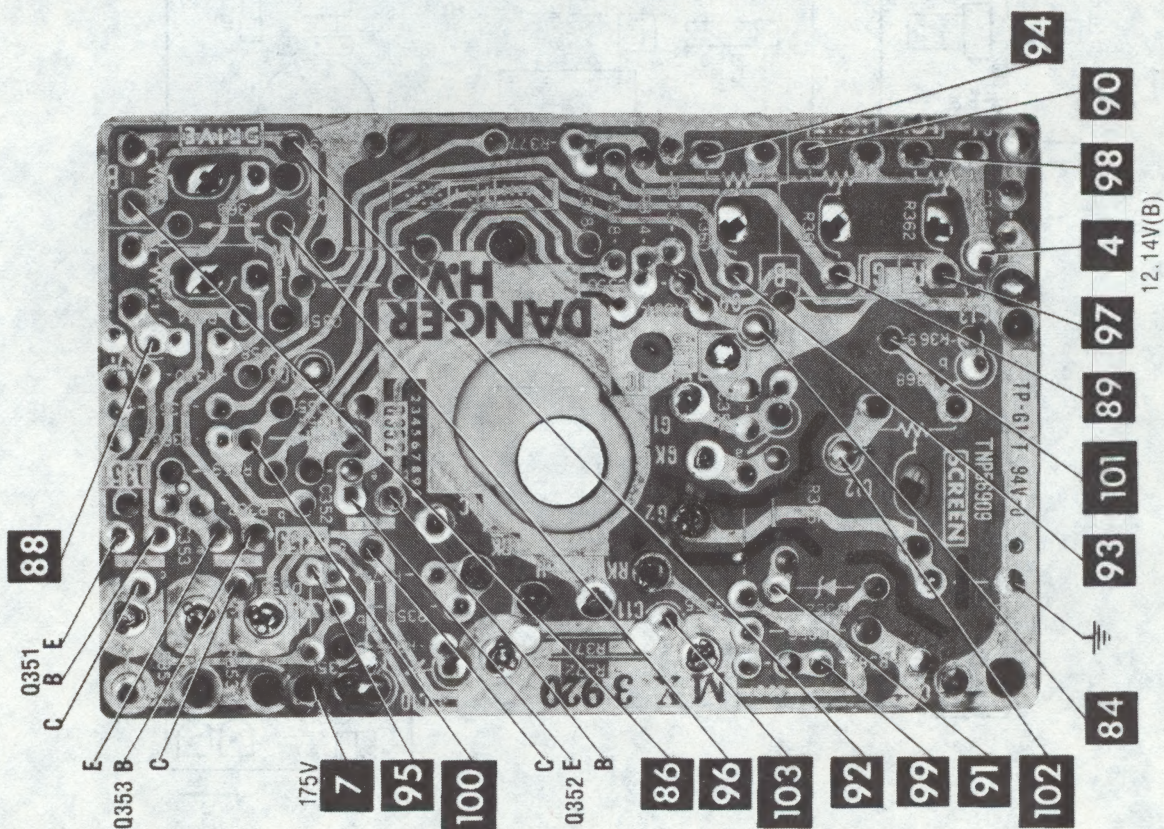
1. With the rear cover removed, supply a nominal 120V, AC to the set, turn on the power switch.
2. Set the customer controls to normal operating positions.
3. Short the R802 with a jumper wire. Confirm that the picture falls out of horizontal sync.
4. If this does not occur, the Horizontal Osc. Disable Circuit is not operating. Follow the Horizontal Oscillator Disable Circuit Repair Procedures before the set is returned to customer.

REPAIR PROCEDURES OF HORIZONTAL OSCILLATOR DISABLE CIRCUIT

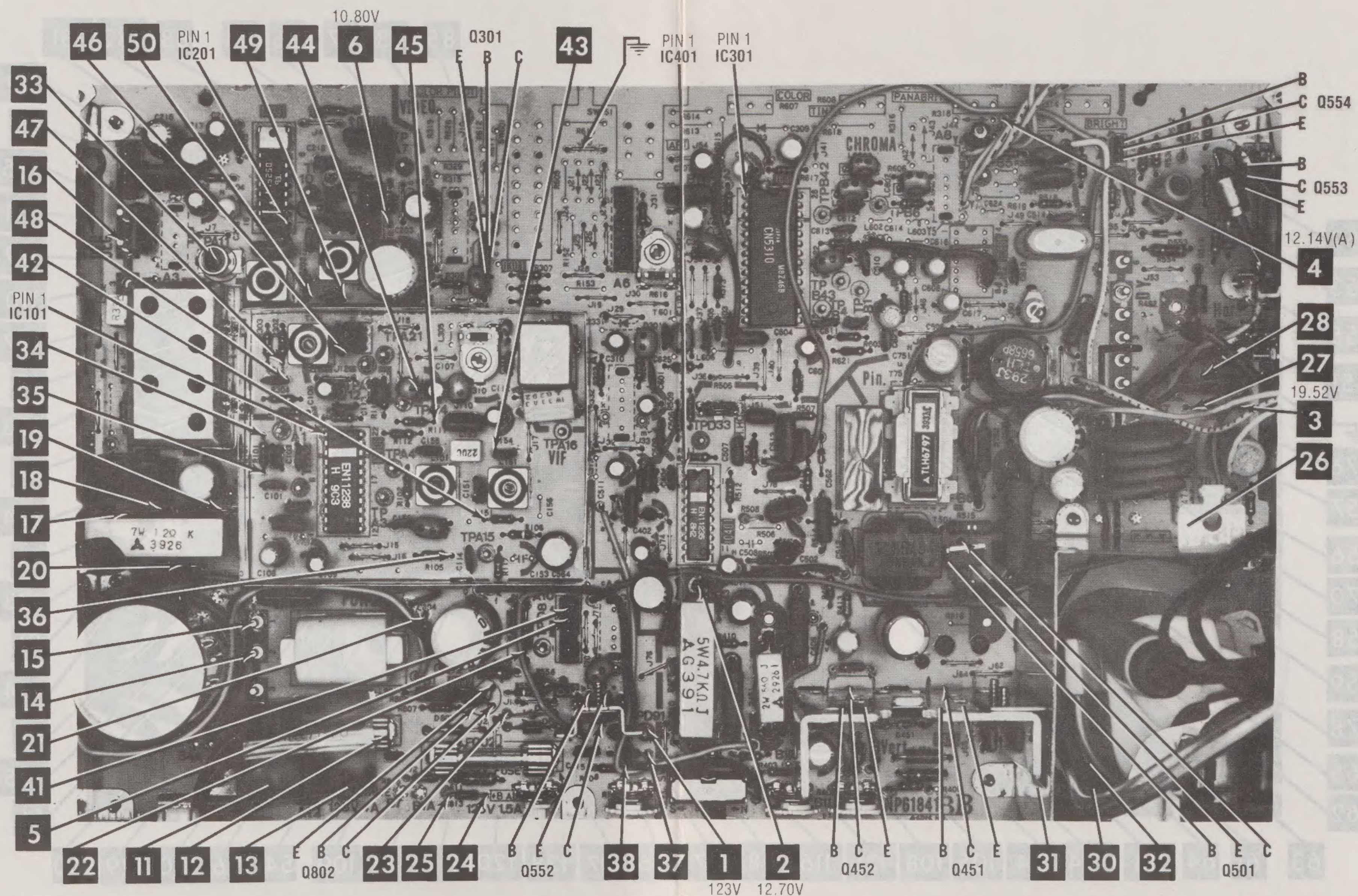
1. Connect a DC voltmeter between capacitor C531 ⊕ on the main circuit board and chassis ground. If nearly +22V is not present on that point, find the cause. Check R531, R532, R537, C531 and D513.
2. Connect a DC voltmeter between the emitter of Q554 on the main board and chassis ground. Emitter potential varies from nearly +12.7V to nearly +12.2V when shorting R802. If this does not occur, find the cause. Check R535, R536, R538, R539, D512, D553 and Q554.
3. Carefully check above specified parts and related circuits and parts. When the circuits is repaired, try the Horizontal Oscillator Disable Circuit Test again.



PLACEMENT CHART



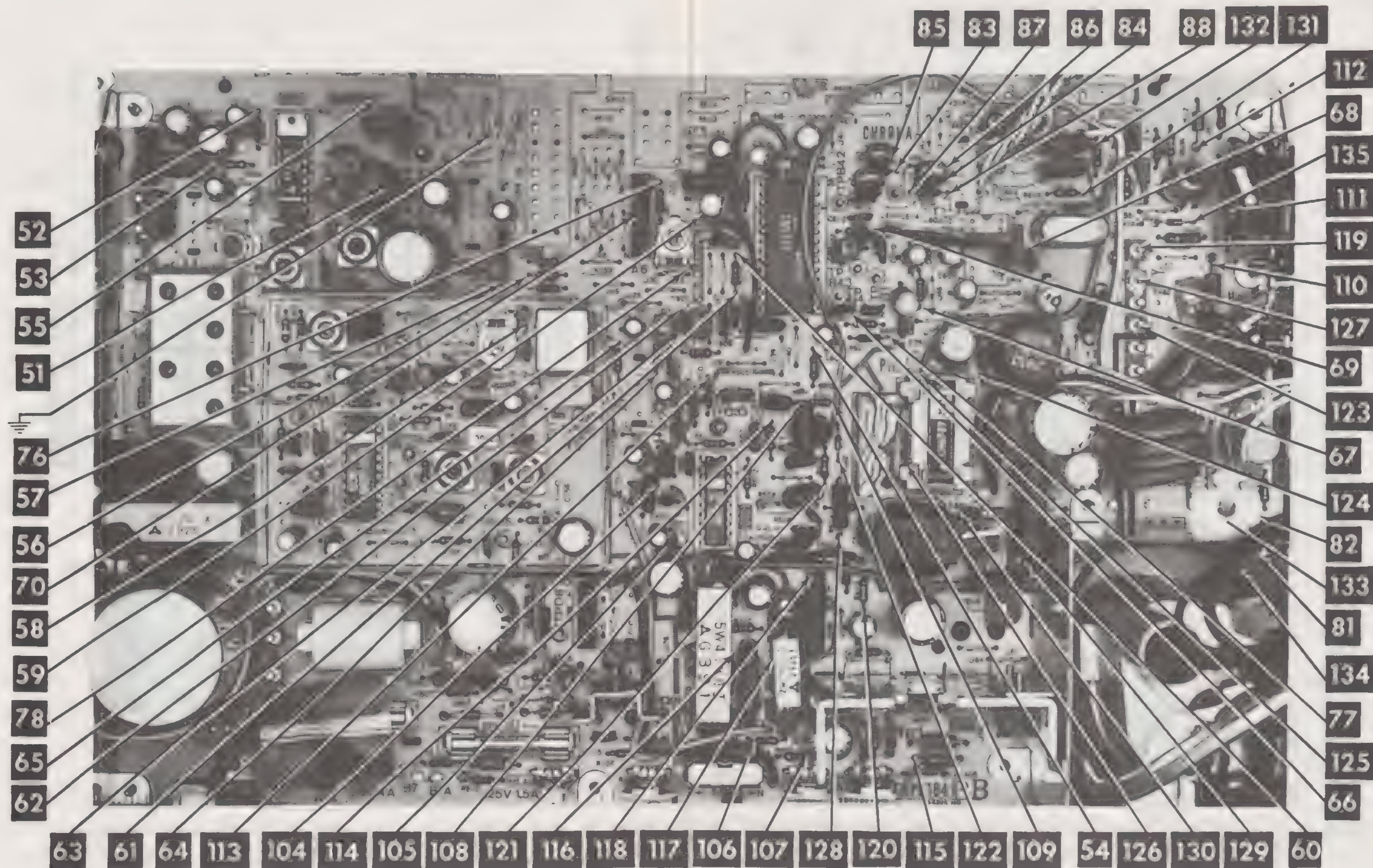
8



MAIN BOARD

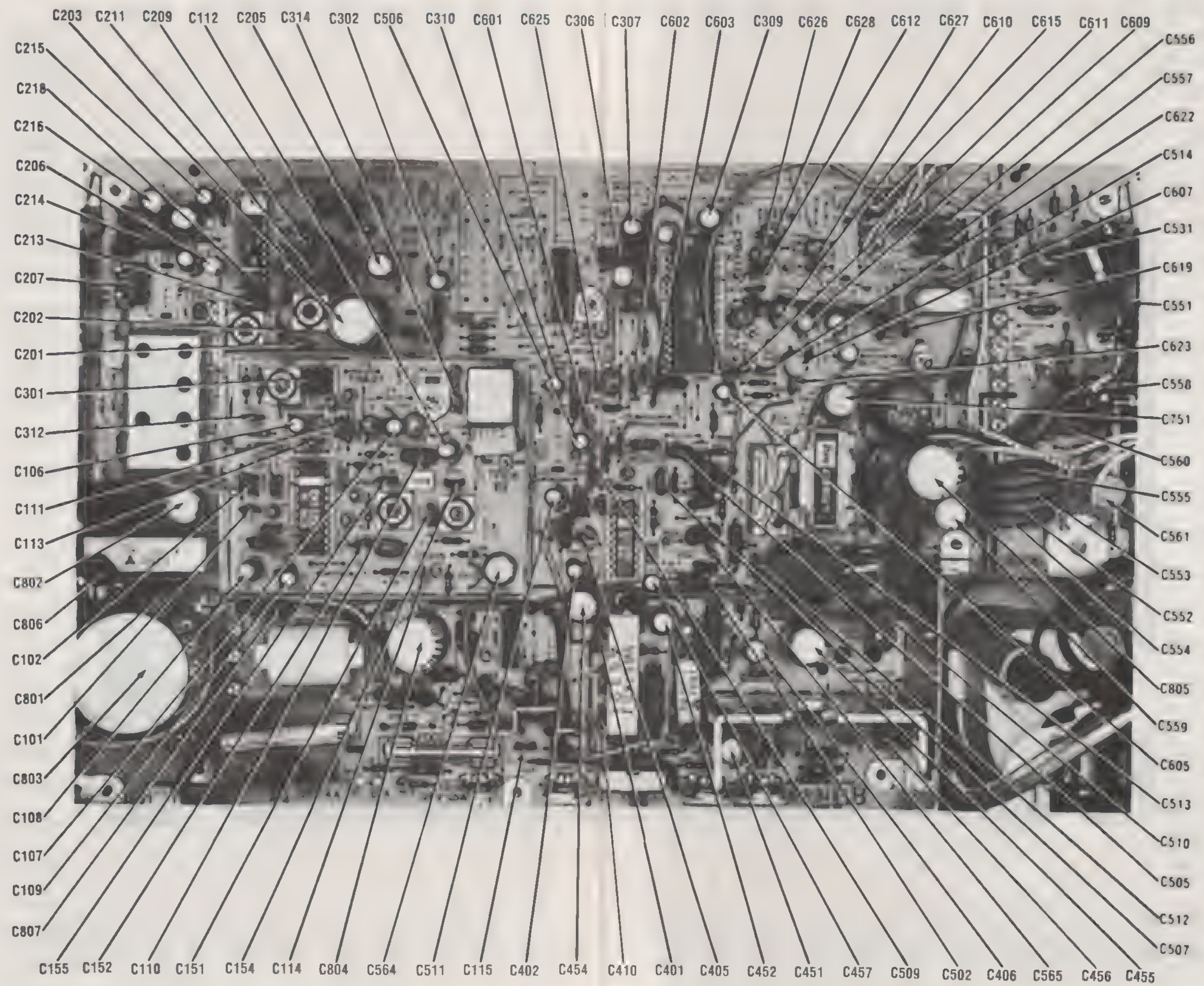
A Howard W. Sams CIRCUITRACE® Photo

MAIN BOARD



MAIN BOARD A Howard W. Sams **CIRCUITRACE** Photo

MAIN BOARD

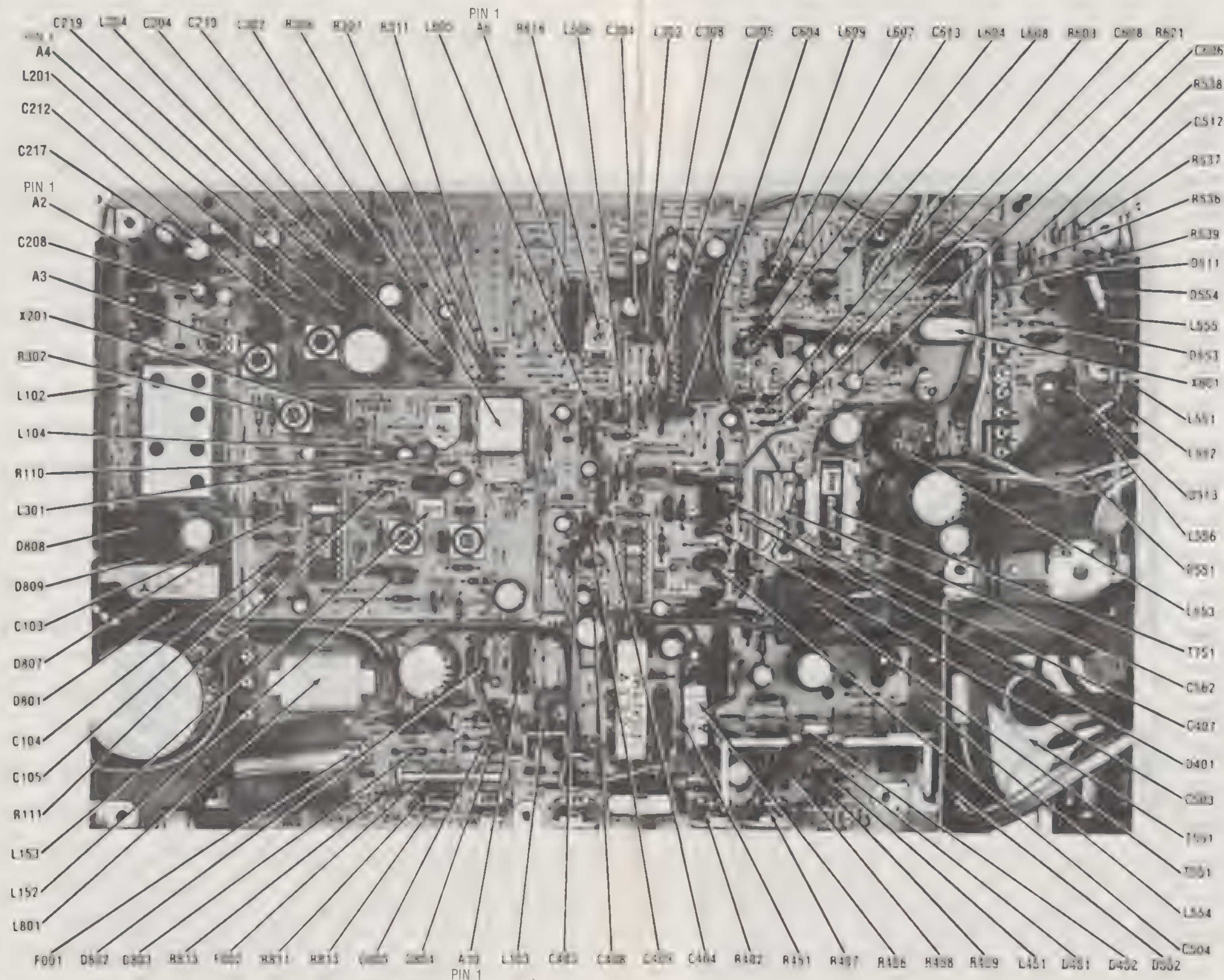


MAIN BOARD

MAIN BOARD

PANASONIC MODEL
CT-909 (Ch. NMX-L2A)

FOLDER 1

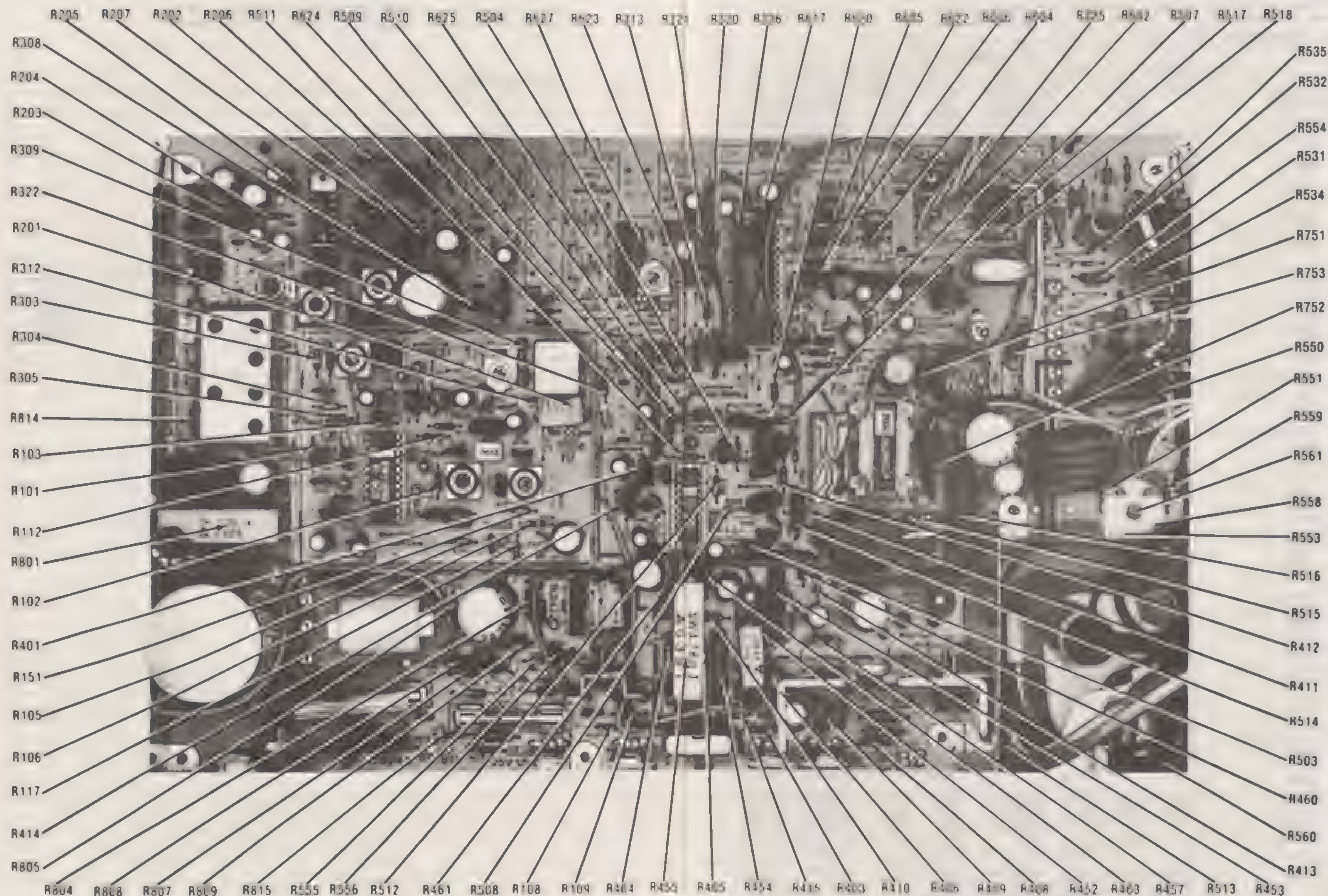


MAIN BOARD

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FOLDER 1



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FOLDER 1

PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RAYTHEON PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
D352	MA1051			ZM5.1B		SK3776/5010A	ECG5010A	TM5010	WEP1411/5010	103-279-10
	RD5.1EC			ZM5.1B		SK3776/5010A	ECG5010A	TM5010	WEP1411/5010	103-279-10
D353	MA1051			ZM5.1B		SK3776/5010A	ECG5010A	TM5010	WEP1411/5010	103-279-10
	RD5.1EC			ZM5.1B		SK3776/5010A	ECG5010A	TM5010	WEP1411/5010	103-279-10
D354	MA150		GE-300	PTC214	REN 177	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1S954(2)		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
D401	MA162		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
D451	MA150		GE-300	PTC214	REN 177	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1S954(2)		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
D452	MA150		GE-300	PTC214	REN 177	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1S954(2)		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
# D511	MA150		GE-300	PTC214	REN 177	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1S954(2)		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
# D512	QA01-07RE	TVSQA01-07RE	GEZD-6.8	ZB6.8B	REN 5071	SK3334/5071A	ECG5071A	TM5071A/**	WEP1106/5071A	103-29020
# D513	RF-1A	TVSRF-1A	GE-511	PTC216	REN 506	SK3843/506	ECG506	TM506	WEP172/506	103-287
# D551	ERB24-06C	TVSERB24-06C	GE-509	PTC203	REN 125	SK3080	ECG552	TM552	WEP170/125	212-Z9000
	RF-1A		GE-511	PTC216	REN 506	SK3843/506	ECG506	TM506	WEP172/506	103-287
# D552	ERB24-06D	TVSERB24-06D	GE-509	PTC203	REN 125	SK3080	ECG552	TM552	WEP170/125	212-Z9000
	RH1M		GE-511	PTC216	REN 506	SK3843/506	ECG506	TM506	WEP172/506	103-287
D553	MA162		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
	1SS55		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
D554	MB-1F	TVSMB-1F	GE-511	PTC216	REN 506	SK3843/506	ECG506	TM506	WEP172/506	103-287
D601	MA150		GE-300	PTC214	REN 177	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1S954(2)		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
D602	MA150		GE-300	PTC214	REN 177	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1S954(2)		GE-514	PTC214	REN 177	SK3100/519	ECG519	TM519	WEP925/519	103-131
D603	OA90G		1N60	PTC206	REN 109	SK3088	ECG109	TM109/**	WEP134/109	103-Z9001
# D801	ERC04-10	TVSERC04-10	GE-509	PTC203	REN 125	SK3080	ECG125	TM125	WEP170/125	212-Z9000
	RM-2C		GE-509	PTC203	REN 125	SK3080	ECG125	TM125	WEP170/125	212-Z9000
D802	RM25	TVSRM25	GEZD-51	ZB51A		SK3341/5089A	ECG5089A	TM5089	WEP1172/5089	103-Z9025
D803	RM12M	TVSRM12M	GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
	ERB12-02		GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
	B0102		GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
# D804	QA01-11SE	TVSQA01-11SE	GEZD-11	ZB11B	REN 5074	SK3139/5074A	ECG5074A	TM5074A/**	WEP1156/5074A	
# D805	MA26W0			PTC302		SK3864/605	ECG605	TM605		
# D807	RM12M	TVSRM12M	GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
	ERB12-02		GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
	B0102		GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
# D809	RM12M	TVSRM12M	GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
	B12-02		GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
	B01-02		GE-504A	PTC201	REN 116	SK3311	ECG116	TM116	WEP156	212-76-02
IC101	EN11238	TVSEN11238								
IC201	AN5250									
IC301	CN5310	TVSCN5310								
IC401	EN11235	TVSEN11235								
Q301	2SD637Q		GE-62*	PTC121*	REN 194*	SK3137/192A	ECG194*	TM194*	WEP66/199*	121-881*
	2SD945A		GE-212	PTC121*	REN 199	SK3124/289	ECG199	TM199/**	WEP1945	121-972*
	25C16850, R,S		GE-62	PTC121*	REN 199	SK3124/289	ECG199	TM199	WEP705*	121-972*
Q351	2SC2637		GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
	2SC1819M		GE-251	PTC907	REN 198	SK3219	ECG198	TM198	WEP779/198	121-Z9028
	2SC1520	TVS2SC1520	GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
Q352	2SC2637		GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
	2SC1819M		GE-251	PTC907	REN 198	SK3219	ECG198	TM198	WEP779/198	121-Z9028
	2SC1520	TVS2SC1520	GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
Q353	2SC2637		GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
	2SC1819M		GE-251	PTC907	REN 198	SK3219	ECG198	TM198	WEP779/198	121-Z9028
	2SC1520	TVS2SC1520	GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
Q451	2SC1683P, Q, (LB)		GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
Q452	2SC1683P, Q, (LB)		GE-251	PTC907	REN 198	SK3220/198	ECG198	TM198	WEP779/198	121-Z9028
Q501	2SC1905H, (LB)		GE-251	PTC907	REN 198	SK3219	ECG198	TM198	WEP779/198	121-Z9028
	2SC1505(I)	TVS2SC1505	GE-251	PTC907	REN 198	SK3219	ECG198	TM198	WEP779/198	121-Z9028
Q551	2SD649Q		GE-259	PTC129A	REN 165	SK3115/165	ECG165	TM165	WEP740B/165	121-1029
Q552	2SC1226Q, P, R		GE-215	PTC186	REN 186A	SK3357	ECG186A	TM186A/**	WEP751/186	121-Z9008
# Q553	2SD637Q		GE-62*	PTC121*	REN 194*	SK3137/192A	ECG194*	TM194*	WEP66/199*	121-881*
	2SC945A		GE-212	PTC121*	REN 199	SK3124/289	ECG199	TM199/**	WEP1945	121-972*
	25C1685Q		GE-62	PTC121*	REN 199	SK3124/289	ECG199	TM199	WEP705*	121-972*
# Q554	2SB642Q		GE-221*	PTC103*	REN 234*	SK3114/290*	ECG234*	TM234*	WEP907/234*	121-879*
	2SA654AQ		GE-65	PTC103*	REN 234	SK3247/234	ECG234	TM234	WEP495	121-879*
Q801	2SD692Q					SK3182/342	ECG247	TM247	WEP976/247	121-29077
	2SC1629A	TVS2SC1629A	GE-75	PTC175	REN 181	SK3563	ECG181	TM181	WEP222/181	121-Z9034
Q802	2SC1473P, MC		GE-222*	PTC170*	REN 287*	SK3244	ECG282*	TM287*	WEP68/287*	121-Z9045*
	2SC1573		GE-222*	PTC170*	REN 287*	SK3433/287*	ECG287*	TM287*	WEP68/287*	121-Z9045*
	2SC1941		GE-220*	PTC170*	REN 287*	SK3244	ECG287*	TM287*	WEP750	121-Z9045*

For SAFETY use only equivalent replacement part.

* Lead configuration may vary from original.

** Also available as exact type replacement.

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C001	.47 50V	ECEA1HSR47	PC1-50	VTT47A63	QV1-3	EV-1610
C002	3.3 50V	ECEA1HS3R3	NLW4-50	VTT3R3A50	QV1-25	EV-1618.1
C004	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C106	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C107	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C108	2.2 50V	ECEA50Z2R2	PC2-100	VTT2R2A50	QV1-21	EV-1617.1
C109	4.7 25V	ECEA1ES4R7	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C112	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C153	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C203	1000 25V	ECEA1ES102	WBR1000-25*	VTT1000N25	QV1-185	EV-1360
C205	100 16V	ECEA1CS101	PC100-16	VTT100E16	QV1-95	EV-1231
C206	1 50V NP	ECEA50N1	WNP1-50*	TCN501A*	QEN1-20*	TVAN-1560*
C208	3.3 25V	ECEA1ES3R3	NLW4-50	VTT3R3A50	QV1-25	EV-1618.1
C209	1 50V NP	ECEA50N1	WNP1-50*	TCN501A*	QEN1-20*	TVAN-1560*
C215	22 16V	ECEA1CS220	PC25-25	VTT22B16	QV1-55	EV-1224
C216	100 25V	ECEA1ES101	PC100-25	VTT100G25	QV1-97	EV-1331
C217	100 16V	ECEA1CS101	PC100-16	VTT100E16	QV1-95	EV-1231
C302	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C304	10 16V NP	ECEA16N10	WNP10-50*	TCN5010A*	QEN1-187*	TVAN-1304.1*
C307	47 16V	ECEA1CS470	PC50-16	VTT47U16	QV1-73	EV-1226
C308	10 16V	ECEA16Z10	PC10-25	VTT10B25	QV1-41	EV-1222
C309	22 16V	ECEA16Z22	PC25-25	VTT22B16	QV1-55	EV-1224
C310	3.3 50V	ECEA1HS3R3	NLW4-50	VTT3R3A50	QV1-25	EV-1618.1
C354	3.3 25V	ECEA1ES3R3	NLW4-50	VTT3R3A50	QV1-25	EV-1618.1
C402	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C405	2.2 25V	ECS225EF2R2V		TDC225M035FL	QDT1-37	SD35-2R29
C406	1 160V	ECEA160V1	WBR1-450*	TC56A*		TVA-1540*
C451	10 50V	ECEA50Z10	PC10-50	VTT10D63	QV1-45	EV-1622
C452	10 100V	ECEA2AS100	WBR10-150*	VTT10G100		TVA-1337*
C454	220 16V	ECEA1CS221	PC250-25	VTT220H16	QV1-117	EV-1240
C455	100 100V	ECEA2AS101	WBR100-150*	TC101018*		TVA-1346*
C457	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C502	33 16V	ECS216F33V		TDC336M035GL		SD35-339
C506	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C511	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C531	10 50V	ECEA50Z10	PC10-50	VTT10D63	QV1-45	EV-1622
C558	220 35V	ECEA1VS221	WBR250-50*	VTT220K35	QV1-121	EV-1440
C559	4.7 250V	ECEA250V4R7U				
C561	3.3 160V NP	ECEA160N3R3				
C564	220 16V	ECEA1CS221	PC250-25	VTT220H16	QV1-117	EV-1240
C605	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C606	.22 50V	ECEA50ZR22		TDC224M050EL	QDT1-10	SD50-R229
C607	4.7 25V NP	ECEA25H4R7	WNP5-50*	TCN505A*	QEN1-113*	TVAN-1303.1*
C608	.22 50V	ECEA50ZR22		TDC224M050EL	QDT1-10	SD50-R229
C609	.1 50V	ECEA50ZR1		TDC104M050EL	QDT1-2	SD50-R109
C615	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C751	22 25V NP	ECEA25H22Q		TCN3520*		TVAN-1652*
C802	4.7 250V	ECEA250V4R7U				
C803	600 200V	ECET200H600Y				
C804	33 160V	ECEA160V33U				
C805	33 160V	ECEA160V33W				

For SAFETY use only equivalent replacement part.

* Axial replacement for radial device.

PANASONIC MODEL
CT-909 (Ch. NM-X-12A)

CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C101	.001 50V 10%			GP210	QCT2-41	10TS-D10
C102	.001 50V 10%			GP210	QCT2-41	10TS-D10
C103	.01 50V			MAG5011		
C104	560 50V 10%			GP356		10TS-T56
C105	.022 50V 10%			M192P2239R8		192P2239R8
C110	.047 50V 10%		DPMS2S47	EWFI1A147	QF1-171	1PB-S47
C111	.01 50V			MAG5011		
C113	68 50V 5%		NPO68	CN0468		10TCC-Q68
C114	.01 50V			MAG5011		
C115	.01 50V			MAG5011		
C151	56 N150 50V 5%	ECCD1H560JP2		*		10TCP-Q56
C152	.01 50V			MAG5011		
C154	4 NPO 50V +.25	ECCD1H040CC		CN0547		
C155	1 NPO 50V +.25	ECCD1H010CC		CN0510		
C201	3 50V +.25	ECCD1H030CC		CN0533		
C202	82 N150 50V 5%	ECCD1H820KP2		*		10TCP-Q82
C204	.022 50V		WMF1S68	M192P2239R8		192P2239R8
C207	.068 50V		DPMS2S47	EWFI1A168	QF1-195	1PB-S68
C210	.047 50V			EWFI1A147	QF1-171	1PB-S47

FOLDER 1

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS[®] for the most up-to-date replacement.

CAPACITORS (cont)

ITEM No.	RATING	MFG. PART No.	REPLACEMENT DATA			
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C211	82 N150 50V 5%	ECCD1H820KP2		*		10TCP-Q82
C212	15 50V 5%		NP015	CN0415		10TCC-Q15
C213	.047 50V		DPMS2547	EWFTA147	QF1-171	1PB-S47
C214	.1 50V 10%		WMF05P1	EWFO5010		431P1049R5
C218	.01 50V			MAG5011		
C219	.01 50V			MAG5011		
C301	82 N150 50V 5%	ECCD1H820JP2		*		10TCP-Q82
C305	150 50V 10%			CN0315		10TCC-T15
C306	.1 50V			EWFO5010		431P1049R5
C312	4 NPO 50V $\pm$.25	ECCD1H040CC	WMF05P1	CN0547		
C314	39 50V 5%			CN0439		10TCC-Q39
C351	470 50V 10%		GP470	GP347	QCT2-35	10TS-T47
C352	680 50V 10%		GP680	GP368		10TS-T68
C353	680 50V 10%		GP680	GP368		10TS-T68
C355	.0022 2KV 10%	ECKD3D222KB8	DPMS20D22		QCT2-35	20PS-D22
C356	470 50V 10%		GP470	GP347		10TS-T47
C357	560 50V 10%			GP356		10TS-T56
C358	560 50V 10%			GP356		10TS-T56
C359	820 50V 10%			GP382		10TS-T82
C361	15 50V 10%		GP820	CN0415		10TCC-Q15
C401	.0047 50V 10%		NP015	M192P4729R8		192P4729R8
C403	.027 50V 10%			M192P2739R8		192P2739R8
C404	560 50V 10%			GP356		10TS-T56
C407	.0056 50V			M192P5629R8		192P5629R8
C408	.01 50V 10%		WMF1S1	EWFTA110	QF1-91	1PB-S10
C409	.001 50V 10%		DPMS6D1	EWFTA210	QF1-1	1PB-D10
C410	100 50V 10%		NP0100	CN0310		10TCC-T10
C456	.0022 50V 10%			M192P2229R8		192P2229R8
C503	.0027 50V 10%			M192P2729R8		192P2729R8
C504	.0027 630V 5%	ECQE6272JZ				
C505	.018 50V			M192P1839R8		192P1839R8
C507	.0068 50V		WMF1D68	EWFTA268	QF1-73	1PB-D68
C509	.0018 50V 10%		GP1800	GP218	QCT2-44	10TS-D18
C510	.0027 500V 10%			GP227		10TS-D27
C512	.001 500V 10%			GP210	QCT2-41	10TS-D10
C513	.1 50V		WMF05P1	EWFO5010		431P1049R5
C514	82 50V 10%		NP082	CN0482		10TCC-Q82
# C551	.0015 2KV 10%	ECKD3D152KB8				
	.0018 2KV 10%					
	.0022 2KV 10%					
# C552	.0022 2KV 10%	ECKD3D222KB8				
# C553	.0022 2KV 10%	ECKD3D222KB8				
# C554	.0022 2KV 10%	ECKD3D222KB8				
# C555	.0022 2KV 10%	ECKD3D222KB8				
# C556	.033 100V 10%	ECQM1333KZ	WMF-1S33	EWFTA133		1PB-S33
# C557	.033 100V 10%	ECQM1333KZ	WMF-1S33	EWFTA133		1PB-S33
# C560	.0033 500V 10%		DPMS6D33	EWFA6233		6PS-D33
# C562	.47 400V 5%	ECQE4474JCA	WMF-4P47 (1)			
C565	.001 50V 10%			GP210	QCT2-41	10TS-D10
C601	120 NPO 50V 5%			CN0312		10TCC-T12
C602	100 50V 5%		NP0100	CN0310		10TCC-T10
C603	.01 50V			MAG5011		
C604	.015 50V 10%			M192P1539R8		192P1539R8
C610	390 50V 10%		GP390	GP339	QCT2-34	10TS-T39
C611	.01 50V			MAG5011		
C612	100 NPO 50V 10%		NP0100	CN0310		10TCC-T10
C613	22 50V 10%		NP022	CN0422		10TCC-Q22
C618	40 Trimmer	ECV1ZW40X32				
C619	47 NPO 50V 5%		NP047	CN0447	QCC2-26	10TCC-Q47
C622	560 50V 10%			GP356		10TS-T56
C623	270 50V 10%					10TCC-T27
C625	18 NPO 50V 5%			CN0418		10TCC-Q18
C626	10 50V $\pm$.5		NP010	CN0410	QCC2-15	10TCC-Q10
C627	10 50V $\pm$.5		NP010	CN0410	QCC2-15	10TCC-Q10
C628	10 50V $\pm$.5		NP010	CN0410	QCC2-15	10TCC-Q10
# C801	.01 500V	ECKD2H103PE7	DPMS6S1	EWFA110	QF1-97	6PS-S10
# C806	.068 100V		WMF1S68	EWFTA168	QF1-195	1PB-S68
# C807	.001 125VAC					
	470 125VAC	ECKDEL471MB				
CA2	5 NPO 50V $\pm$.25	ECCD1H050CC				

For SAFETY use only equivalent replacement part.

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

(1) 5% tolerance available on order from manufacturer.

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA		
			MFGR. PART No.	MALLORY PART No.	TRW PART No.
R107	RF AGC	5000	EVTVOU00MB53	MTC53L1	X201R502B
R210	Volume/Switch	10K	EVVON6F25A14		
R310	Sub Contrast	2000	EVT33MA00B23	MTC23L1 (3)	U260R252B
R314	Brightness	200	EVH9GAF25B22		
		Detent @ 33%			
R318	Panabrite	10K	EVH3WAF25B14		
R326	Sub Brightness	2000	EVT33A00B23	MTC23L1 (2)	X201R252B (2)
R360	Blue Low Light	5000	EVT33MA00B53	RVA0911H502	U260R502B
R361	Green Low Light	5000	EVT33MA00B53	RVA0911H502	U260R502B
R362	Red Low Light	5000	EVT33MA00B53	RVA0911H502	U260R502B
R363	Blue Drive	2000	EVT33MA00B23	MTC23L1 (3)	U260R252B
R364	Red Drive	2000	EVT33MA00B23	MTC23L1 (3)	U260R252B
R368	Screen	4Meg	EVME6U10KB46	MTC355L1 (3)	
R402	Vert Hold	5000	EVTVOU00MB53	MTC53L1	X201R502B
R407	Vert Size	100	EVTY7U00MB12	MTC12L1	X201R101B
R505	Horiz Hold	5000	EVTY3A00B53	MTC53L1 (2)	X201R502B (2)
R560	Focus Unit	15Meg	EVMPRG528219		
		Variable			
R607	Color/QII Lock Switch	10K	EVK5D3F25B14		
R608	Tint/AFT Switch	10K	EVK5D3F25B14		
R616	Sub Color	100K	EVT33MA00B15	RVA0911H104	U260R104B
R812	B+ Adjust	500	EVTVOU00MB52		

For SAFETY use only equivalent replacement part.

(2) Cut off one of the end terminals and bend to fit P.C. board.

(3) For horizontal mounting, bend the two outside terminals to fit P.C. board. Use jumper to connect center terminal to P.C. board.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		MFGR. PART No.	WORKMAN PART No.			MFGR. PART No.	WORKMAN PART No.
# D808	8 Cold PTC	ERPF5B0M080F		# R538	18K 5% 1/4W	ERD25TJ183	22-1126
R201	33 5% 1W WW	ERQ1CJ330		# R539	12K 5% 1/4W	ERD25TJ123	22-1122
	Flameproof				Carbon		
# R372	2.7 5% 2W WW	ERQ2CJ2R7		# R551	.47 10% 1/2W	ERD12HXR47	
	Flameproof				Flameproof		
# R455	4700 5% 5W WW	ERG5CJ472		# R801	1.2 10% 7W WW	ERF7ZK1R2	
R456	56 5% 2W WW	ERF2SJ560		# R802	130 5% 20W WW	ERF20BM131Y	
# R458	2.7 5% 1/4W	ERD25FJ2R7	22-1034	# R803	6.8 5% 3W WW	ERF3ATK6R8	
	Flameproof Carbon			# R804	12K 5% 1/4W	ERD25FJ123	22-1122
# R513	1 5% 1/2W	ERQ12HJ1R0			Carbon		
	Flameproof Carbon			# R805	47 5% 1/4W	ERD14FJ470	22-1064
# R516	1200 5% 3W	ERG3ANJ122			Carbon		
	Metal Oxide			# R811	47K 1% 1/2W	ERD50CKF4702	
# R531	47 5% 1/4W Carbon	ERD25TJ470	22-1064		Carbon		
# R532	32.4K 1% 1/4W	ERD25CKF3242		# R813	5300 1% 1/4W	ERD25CKF5301	
	Carbon				Carbon		
# R534	68K 5% 1/2W	ERD50TJ683	22-2140	# R814	220K 5% 1/4W	ERD25TJ224	22-1152
	Carbon				Carbon		
# R535	330 5% 1/4W	ERD25TJ331	22-1084	# R815	270 5% 1/4W	ERD25TJ271	22-1082
	Carbon				Carbon		
# R536	680 5% 1/4W	ERD25TJ681	22-1092	# RA2	100K 5% 1/2W	ERD12TJ104	22-2144
	Carbon				Carbon		
# R537	13K 1% 1/4W	ERD25CKF1302					
	Carbon						

For SAFETY use only equivalent replacement part.

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
LAI	Balun	TLR69356			
L101	Video IF	TL168751			
L102	Peaking (.33uH)	TLQR33N205C			
L103	Peaking (.330uH)	TLT301K999G			
L104	Peaking (15uH)	TLT150-999			
L151	Video IF	TL167394			
L152	Peaking (1uH)	TLT010L999G			
L153	Peaking (22uH)	TLQ220K205G			
L201	Peaking (1uH)	TLT010L999G			
L301	Peaking (4.7uH)	TLT047L999G			
L302	Delay Line	TLK871			
L303	Peaking (56uH)	TLT560K999G			
L304	Peaking (56uH)	TLT560K999G			
L351	Peaking (180uH)	TLT181K999G			
L604	Peaking (33uH)	TLT330K999G			
L605	Peaking (22uH)	TLT220K999G			
L606	Peaking (12uH)	TLT120K999G			
L607	Peaking (33uH)	TLT330K999G			
L608	Peaking (33uH)	TLT330K999G			
L609	Peaking (33uH)	TLT330K999G			
# L801	Line Filter	TLP6505-2P			
T101	HLB Filter	TL166653			
T201	Sound IF	TL562313			
T202	Sound IF	TL563318			
T301	Video IF	TL163307			

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

COILS & TRANSFORMERS (Sweep Circuits)

ITEM No.	FUNCTION	REPLACEMENT DATA				
		MFGR. PART No.	OTHER IDENTIFICATION	MILLER PART No.	THORDARSON PART No.	TRIAD PART No.
# L553	Horiz Pin Phase	TLH6658P				
# L560	Yoke Horiz 1.8mH Vert 190mH	TLY5384F				
# T501	Horiz Drive	TLH6434				
# T551	Horiz Output	TLF6041F				
# T751	Pincushion	TLH6797				

For SAFETY use only equivalent replacement part.

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
EAS-1	4" PM 16 Ohms	EAS10P85SB	4A1Z16	

FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
# F001	4A @ 125V Slow-Blow	XBA1F40NU14A	TJC6319	MDX4	1A1907-02	313004	102071	
# F002	1.5A @ 125V Quick-Acting	XBA1F15NU14A	TJC6319	AGC1-1/2	1A1907-02	31201.5	102071	F61-1/2-2

For SAFETY use only equivalent replacement part.

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
A1	Connector	TZS9009	3 Pin
A4	Connector	TXAJT04909	
A6	Connector	TXAJT06909-1	
A10	Connector	TXAJT10909	
# CRA1	Component Combination	TXNU471P02M	Antenna Isolation
# CRA2	Component Combination	TXNU471P02M	Antenna Isolation
# CRA3	Component Combination	TXNU471P02M	Antenna Isolation
# CRA4	Component Combination	TXNU471P02M	Antenna Isolation
# CRA5	Component Combination	TXNU131P23M	Antenna Isolation
# CRA6	Component Combination	TXNU131P23M	Antenna Isolation
L451	Ferrite Bead	TLP408	
L551	Ferrite Bead	TSC911	
L552	Ferrite Bead	TSC911	
L554	Ferrite Bead	TLP408	
L555	Ferrite Bead	TSC909	
L556	Ferrite Bead	TSC909	
# L899	Degaussing Coil	TLK59067	
# PL1	AC Cord	TSX1148	
SW151	Switch	EVK5D3F25B14	AFT (Part of Tint Control)
SW301	Switch	ESD7022	Service
SW601	Switch	EV5D3F25B14	QII Lock (Part of Color Control)
# SW801	Switch	EVVON6F25A14	Power On/Off (Part of Volume Control)
# V1	CRT	19VJTP22	
X201	Filter	EFCS4R5MS3	
X601	Crystal	TSS616-1	3.58MHz
	Antenna	TJB524202	Terminal
	Antenna UHF	TS4343	RUSSELL Loop Replacement LIN-2H
	Antenna VHF	TSAB108-1	RUSSELL Loop Replacement SIM-4H
			RUSSELL Assembly Replacement POR-12H
	Connector	TXFJT01909	3 Pin
	Magnet	XFMK0148G	
	P.C. Board	TNP56909ZA	CRT
	P.C. Board	TNP61841BB	Main Board
	P.C. Board	TNP56910ZA	Q
	Plug	TJS168120	3 Pin
	Plug	TJS168130	4 Pin
	Plug	TJS168150	6 Pin

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS* for the most up-to-date replacement.

MISCELLANEOUS (cont)

ITEM No.	PART NAME	PART No.	NOTES
#	Socket	TJS35040	CRT
#	Tuner UHF	TNK36121EB	
	Tuner VHF	TNT6675FEB	
	Yoke	TLC2024-28	Convergence

For SAFETY use only equivalent replacement part.

CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Cabinet	TXFKY11909	Knob-Fine Tuning UHF	TBX17408-1
Control Panel	TXFKP01909	Knob-Fine Tuning VHF	TBX17408-1
Knob-Bright, Panabrite	TBX6575-6	Rear Cover	TXFKU01909
Knob-On/Vol, QII Lock/Color, AFT/Tint	TBX17588-2	UHF Indicator	TKK170317-3
Knob-Channel Selector UHF	TBX17732-1	UHF Indicator Window	TKP1710924
Knob-Channel Selector VHF	TBX17733-1		

WIRING DATA

High Voltage Lead	Use BELDEN No. 9867 (30 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor)
	8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8528 (Solid) Available in 13 Colors
	8522 (Stranded) Available in 13 Colors
300-Ohm Tuner Input Lead	Use BELDEN No. 8225
75-Ohm Tuner Input Lead	Use BELDEN No. 8241
300-Ohm Antenna Lead-in	Use BELDEN No. 8275 (Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) 4-Conductor
	8485 (Round) 5-Conductor
	8488 (Round) 8-Conductor

MISCELLANEOUS ADJUSTMENTS

B+ ADJUSTMENT

Connect a voltmeter to TPD91, low side to ground. Adjust B+ Adjust Control (R812) for +123.5 volts +1.5V - 2.5V.

HIGH VOLTAGE ADJUSTMENT

Place Service Switch (S301) to Service position and connect a high voltage meter to the picture tube anode. The high voltage should read 28.0KV +1.5KV. If high voltage is out of tolerance, adjust B+ Adjust Control (R812) for proper high voltage range.

RF AGC ADJUSTMENT

Tune in a weak local station. Slowly turn RF AGC Control (R107) clockwise (from full counterclockwise) to a point where noise in the picture is at MINIMUM.

HORIZONTAL HOLD ADJUSTMENT

Tune in a TV station and set all controls for normal operation. Adjust Horizontal Hold (R505) to a point where it is virtually impossible to lose horizontal sync while switching from channel to channel.

SUB COLOR AND SUB CONTRAST ADJUSTMENTS

Tune in a color program. Set QII Lock Switch to Off. Place Tint and Color Controls to center of rotation. Adjust Sub-Color (R616) and Sub-Contrast (R310) until proper color saturation is obtained.

AUTOMATIC BEAM LIMITER (ABL) ADJUSTMENT

Factory adjusted and usually requires no further adjustment.

Connect an ammeter between TPD1 and TPD2 (+ terminal of ammeter to TPD1).

Tune in a color bar pattern. Set QII Lock Switch to Off, Panabrite Control to Maximum, Bright Control and Color Control to MINIMUM.

Adjust Sub-Bright Control (R326) for 650 microamps.

APC ADJUSTMENT

Connect a color bar generator to the antenna terminals and tune in a color bar pattern. Set QII Lock Switch to Off, Color, Tint and

Sub-Color (R616) Controls to midrange.

Connect a 470K ohm resistor from TPB4 to TPB5, a 100K ohm resistor from TPB1 to TPB7, a .01mfd capacitor from TPB43 to TPB5. Adjust trimmer capacitor (C618) until color bars stop or slowly drift across the screen. Remove capacitor and resistor. Change channel, confirm color sync is kept.

COLOR PURITY ADJUSTMENT

Tune in a TV station and turn Bright Control to Maximum. Turn R (R362) and B (R360) Low Light Controls to MINIMUM. Adjust G (R361) Low Light Control to obtain a green screen. Unlock lock nut to release purity rings, loosen the deflection yoke and move it back against the convergence assembly. Use a degaussing coil to demagnetize picture tube and mounting brackets. Adjust the purity tabs to place the green bar in the center of the screen. Move the deflection yoke forward until a uniform green raster is obtained. Adjust purity correction magnets if necessary.

COLOR TEMPERATURE ADJUSTMENTS

Tune in a TV station and turn Color Control to MINIMUM. Set QII Lock Switch to Off position. Turn R, B and G Low Light Controls (R362, R360, R361) 45 degrees counterclockwise from full clockwise position. Set Service Switch (SW301) to Service. Turn Screen Control (R368) to MINIMUM, then advance control slowly until a faint horizontal line is visible. Adjust Low Light Controls for a low level white line. Set Service Switch (SW301) at Normal and adjust Red (R364) and Blue (R363) Drive Controls for best black and white picture at high brightness.

COLOR TEMPERATURE ADJUSTMENTS

Tune in a TV station and turn Color Control to MINIMUM. Set QII Lock Switch to Off position. Turn R, B and G Low Light Controls (R362, R360, R361) 45 degrees counterclockwise from full clockwise position. Set Service Switch (SW301) to Service. Turn Screen Control (R368) to MINIMUM, then advance control slowly until a faint horizontal line is visible. Adjust Low Light Controls for a low level white line. Set Service Switch (SW301) at Normal and adjust Red (R364) and Blue (R363) Drive Controls for best black and white picture at high brightness.

RESISTANCE MEASUREMENTS

MEASUREMENTS BELOW TAKEN WITH METER HAVING .08V MAX BETWEEN PROBE TIPS														
ITEM	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12	PIN 13	PIN 14
V1	60M	NC	NC	NC	12K	155K	4.2M	155K	FIL	FIL	155K	NC	NC	
IC101	67K	2160	7400	0	7110	21K	21K	7180	69K	71K	4940	10K	0	43K
							PIN 15 16K	PIN 16 INF	PIN 17 INF	PIN 18 16K	PIN 19 352	PIN 20 1879	PIN 21 1334	PIN 22 67K
IC201	5270	5270	396	10K	21K	319	INF	56K	0	33K	14K	24K	5700	INF
													PIN 15 INF	PIN 16 0
IC301	352	8810	2070	2450	14K	INF	28K	352	12K	414	6200	INF	5300	0
	PIN 15 214K	PIN 16 INF	PIN 17 INF	PIN 18 INF	PIN 19 INF	PIN 20 INF	PIN 21 INF	PIN 22 INF	PIN 23 INF	PIN 24 INF	PIN 25 INF	PIN 26 1347	PIN 27 1240	PIN 28 1304
IC401	12K	5930	3160	2190	8180	INF	6000(1)	45K	3990	0	4460	1258	6000(1)	19K
											PIN 15 700K	PIN 16 97K	PIN 17 43K	PIN 18 3220
ITEM	E	B	C		ITEM	E	B	C		ITEM	E	B	C	
Q301	1249	37K	953		Q452	2.7	3820	30K		Q553	1344	13K	25K	
Q351	1251	1340	148K		Q501	0	270	11K(1)		Q554	18K	25K	19K	
Q352	1227	1186	148K		Q551	0	.35	9000(1)		Q801	9000(1)	11K(1)	9000(1)	
Q353	1289	1417	148K		Q552	360	INF(2)	INF(2)		Q802	INF(2)	5700	34K(1)	
Q451	30K	14K(1)	9000(1)											

- (1) This reading will vary depending upon the condition of the electrolytic in the circuit.
 (2) Reading depends upon polarity of meter connections.

TROUBLESHOOTING CHECK CHART

The following chart lists component failures most likely to produce the indicated symptom:

PICTURE or SOUND

NO PIC, NO SOUND, NO RASTER: Fuses,AVR,Reg,Ref Amp,D801 thru D805,D807,D809.

NO PIC, NO SOUND, HAS RASTER: Tuner,VIF (IC101),
 NO PIC, NO SOUND, HAS SNOW: Tuner,AGC (IC101).
 NO PIC, HAS SOUND, NO RASTER: Video Inverter,
 Video (IC301),CRT.

NO PIC, HAS SOUND, HAS RASTER: Video Inverter,
 Video (IC301).

HAS PIC, NO SOUND: Audio-SIF (IC201).
 OVERLOADED PICTURE: AGC (IC101).
 LOW OR EXCESSIVE BRIGHTNESS: Video Inverter,
 Video (IC301).

SYNC

NO VERT SYNC: Vert (IC401).
 NO HORIZ SYNC: Horiz (IC401).
 NO VERT/HORIZ SYNC: Sync (IC401).

RASTER

YELLOW (NO BLUE): Chroma (IC301),B Out,D353,CRT.
 CYAN (NO RED): Chroma (IC301),R Out,D354,CRT.
 MAGENTA (NO GREEN): Chroma (IC301),G Out,D355,
 CRT.

SWEEP

NO RASTER, HAS SOUND: HV Rect (T551),CRT,D554.
 NO RASTER, NO SOUND: Horiz (IC401),Horiz Drive/
 Out,Horiz Osc Disable Amp/Out.

NO VERT DEFLECTION: Vert (IC401),Vert Outs.
 POOR VERT LIN OR FOLDOVER: Vert (IC401),Vert
 Outs.

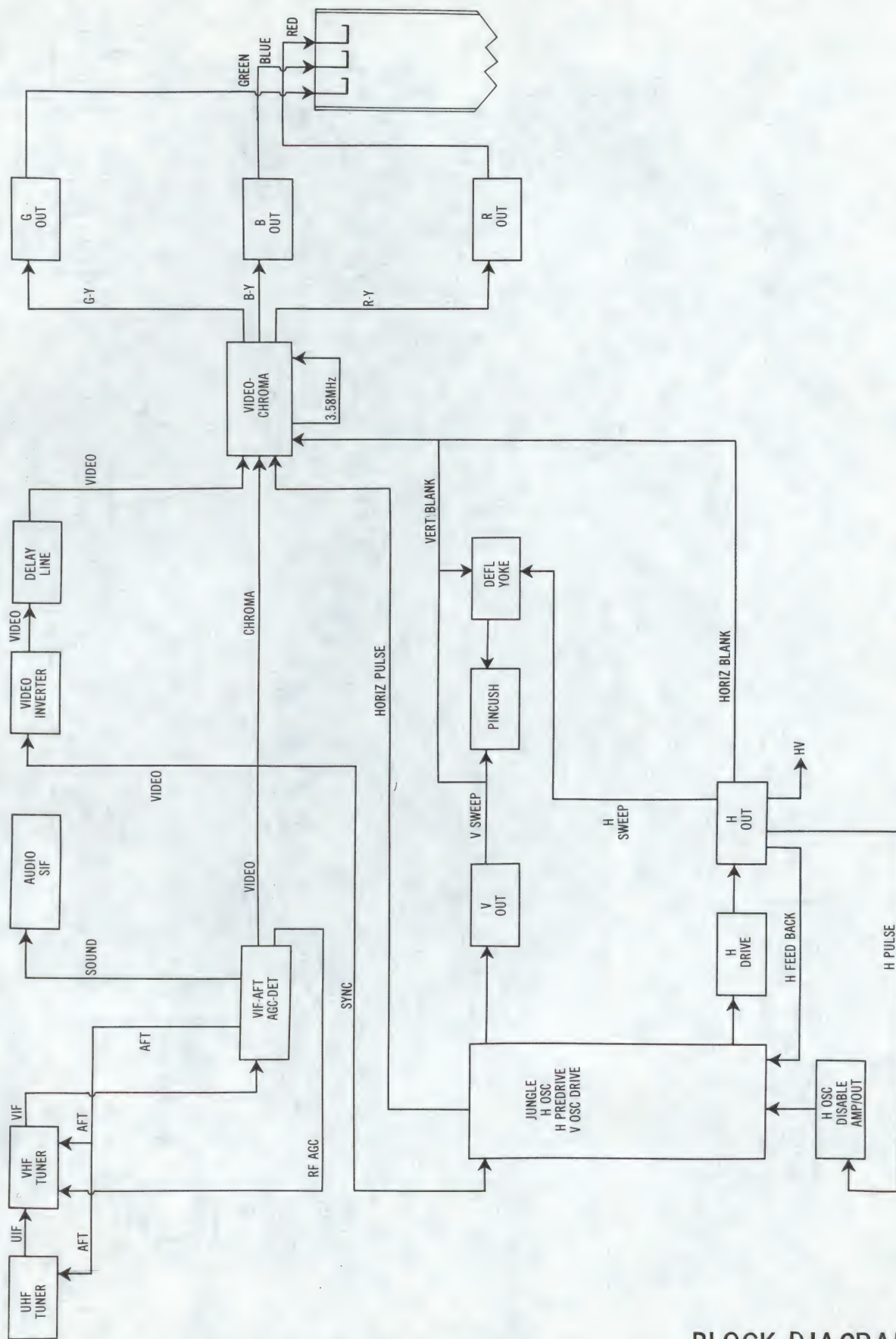
POOR HORIZ LIN OR FOLDOVER: Horiz Drive/Out,
 D554.

NARROW PICTURE: Horiz Drive/Out,D554.
 VERT OFF FREQUENCY: Vert (IC401).
 HORIZ OFF FREQUENCY: Horiz (IC401).

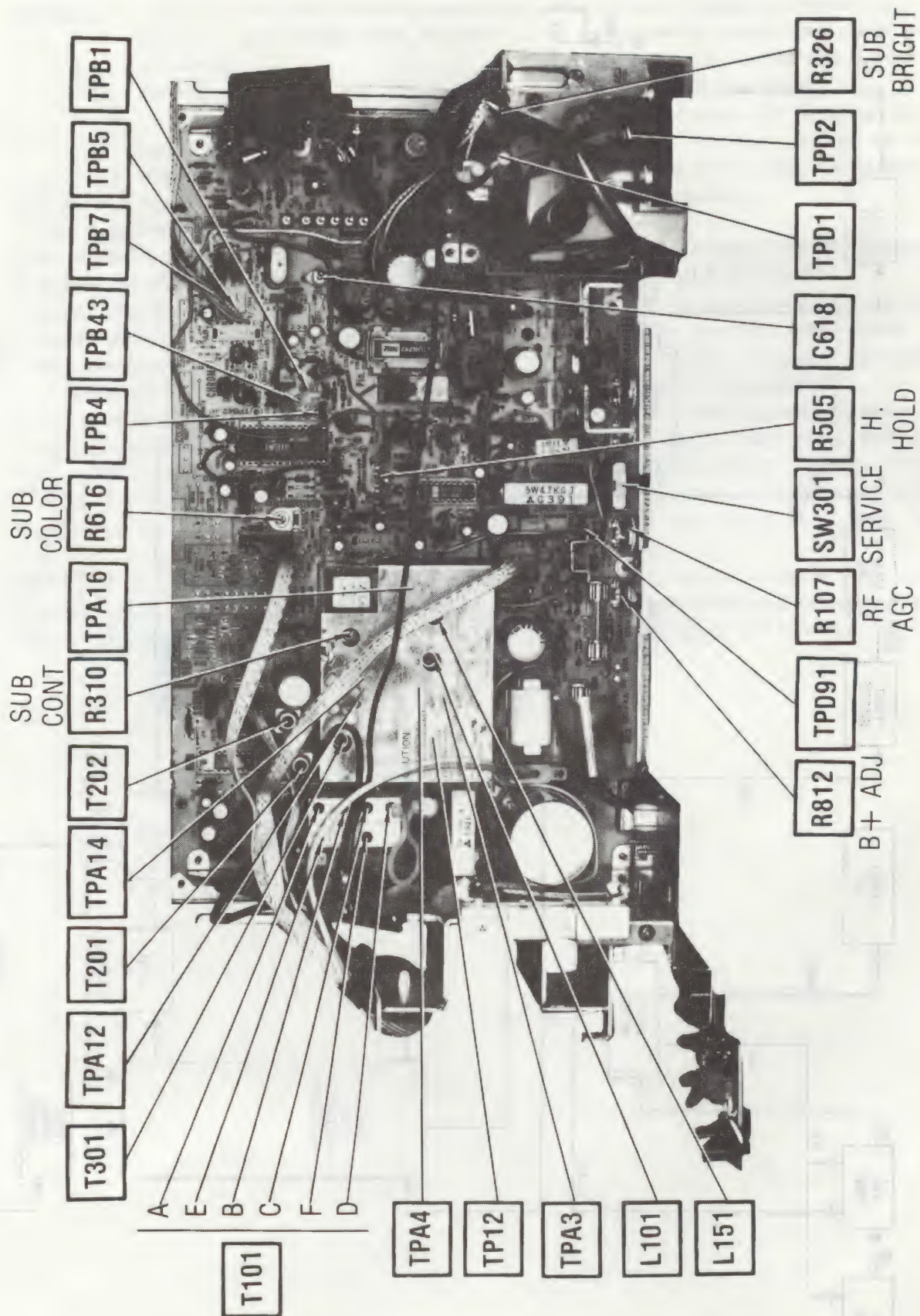
COLOR (B/W operating normally)

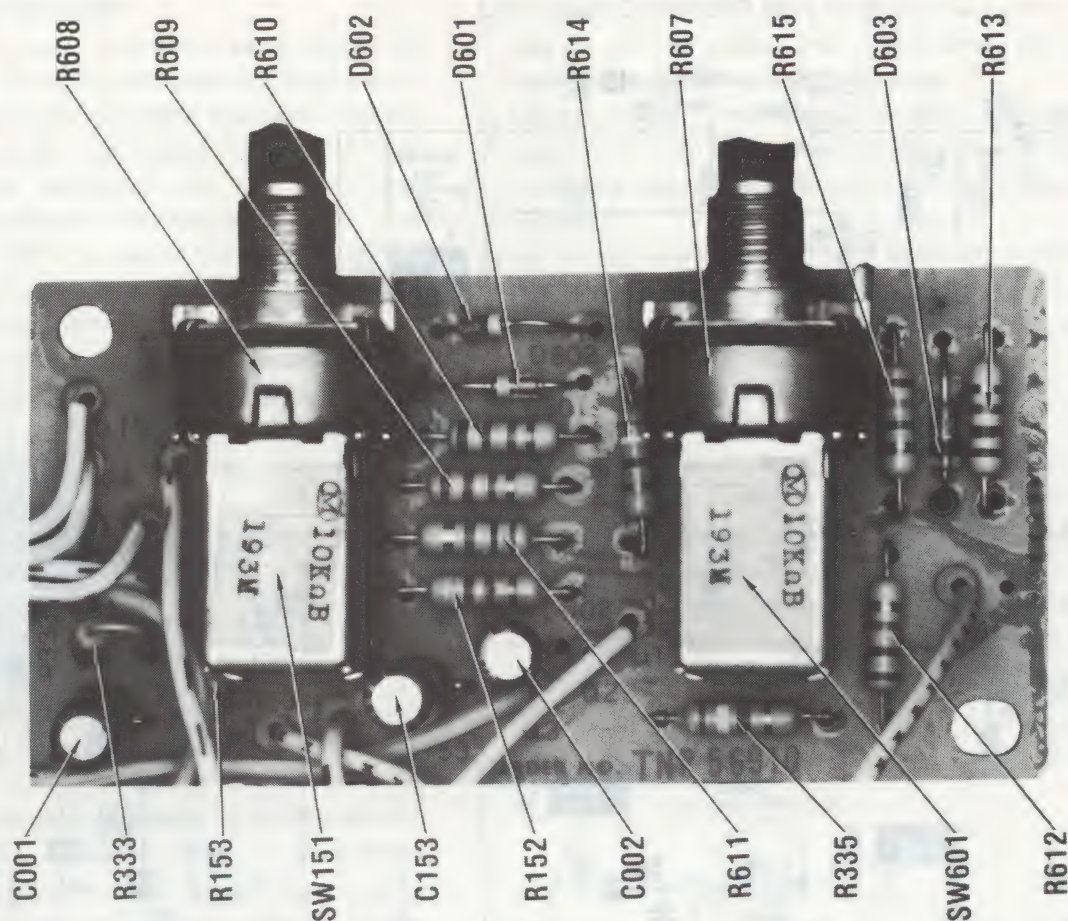
NO COLOR: Chroma (IC301).
 WEAK COLOR: Chroma (IC301).
 NO COLOR SYNC: Chroma (IC301).
 NO GREEN: Chroma (IC301),D355,G Out.
 NO BLUE: Chroma (IC301),D353,B Out.
 NO RED: Chroma (IC301),D354,R Out.
 INCORRECT HUE (TINT): Chroma (IC301).

BLOCK DIAGRAM



MAIN BOARD

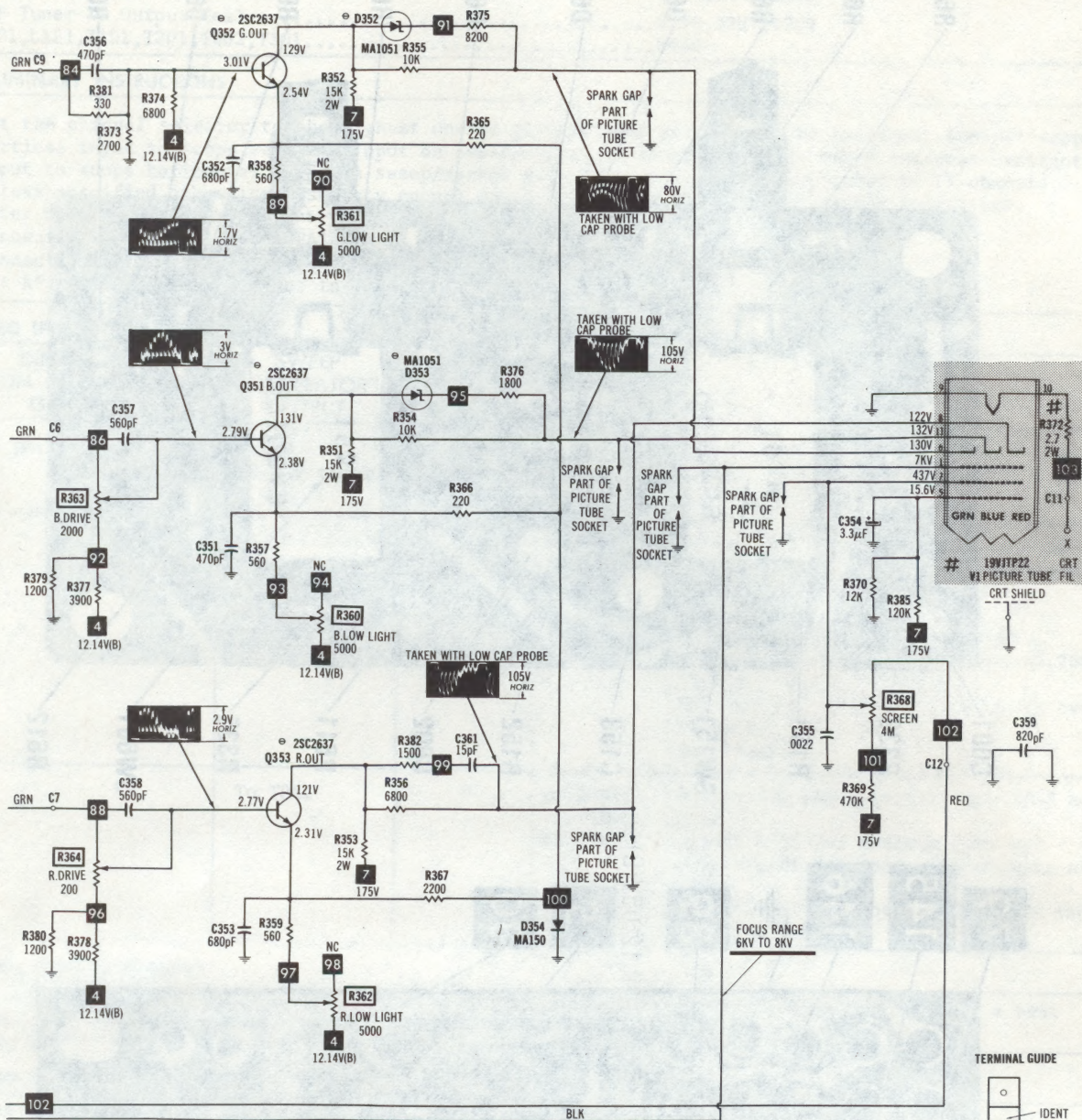




FOLDER 1

TV ALIGNMENT INSTRUCTIONS

Use an isolation transformer, or observe polarity, etc.
Align 200Hz horizontal signal for receiver and transmitter.
Suggested alignment sequence:
1. Time



For SAFETY use only equivalent replacement part.

— Circuitry not used in some versions

--- Circuitry used in some versions

⊙ See parts list

⊗ Nominal value

⊕ Ground

◆ Flame retardant resistor

Waveforms: triggered scope, keyed rainbow generator

Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltage maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

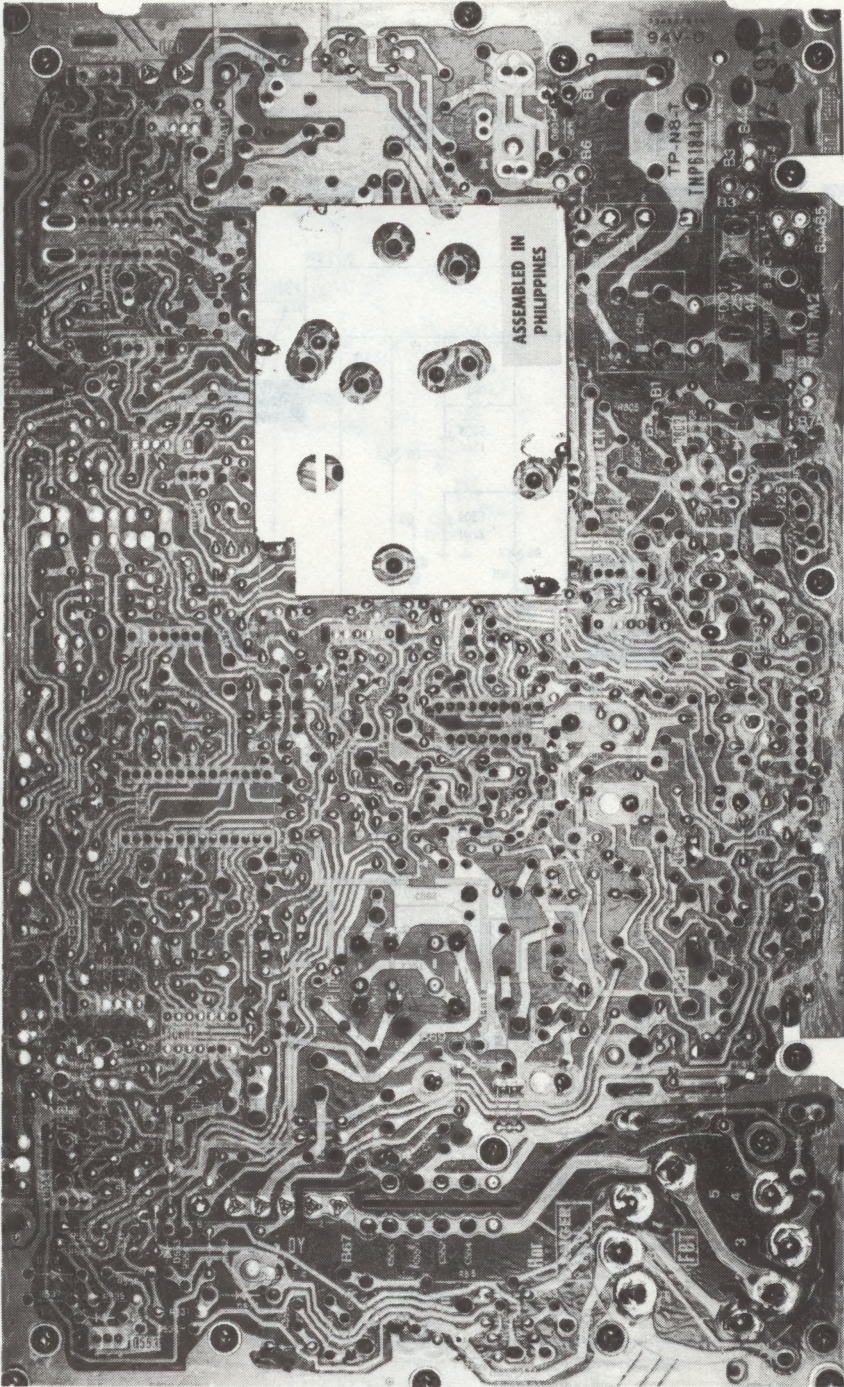
Resistors are 1/2W or less, 5% unless noted.

Value in () used in some versions.

A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH CIRCUITRACE®

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MAIN BOARD-SHIELD LOCATION

SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. It is advisable to insert an isolation transformer in the power line and AC supply before servicing a hot chassis.
2. When servicing, observe the original lead dress; especially the lead dress in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers, shields, and isolation R-C combinations, are properly installed.
4. Before turning the receiver on, measure the resistance between B+ line and chassis ground. Connect $\ominus$ side of an ohmmeter to the B+ lines, and $\oplus$ side to chassis ground. Each line should have more resistance than specified, as follows:

B+Line	Minimum Resistance
123V	1.5K Ω
20V	200 Ω
12V	200 Ω

5. When the TV set is not to be used for a long period of time, unplug the power cord from the AC outlet.
6. Potentials, as high as 29.5KV are present when this receiver is in operation. Operation of the receiver without the rear cover involves the danger of a shock hazard from the receiver power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment. Always discharge the anode of the picture tube to the receiver chassis before handling the tube.
7. After servicing make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the receiver's power switch.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the receiver, such as screwheads, antennas, control shafts, handle bracket, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 240 k Ω and 5.2M Ω . When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

LEAKAGE CURRENT HOT CHECK (See figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5 k Ω , 10watts resistor, paralleled by 0.15 μ F capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and the receiver should be repaired and rechecked before it is returned to the customer.

Hot-Check Circuit

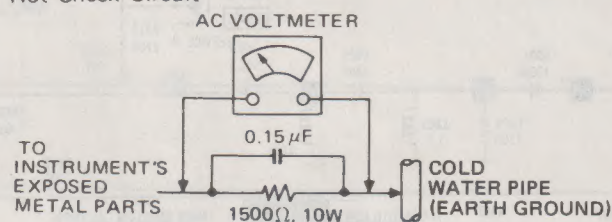
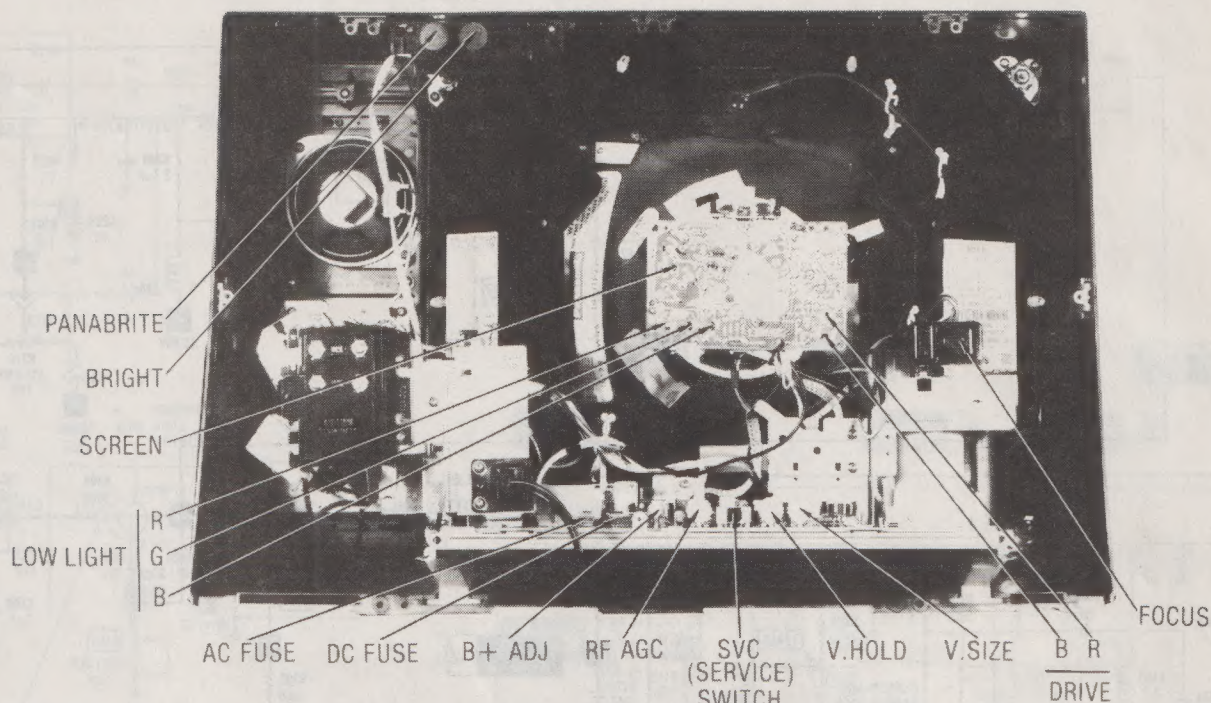


Figure 1

PANASONIC MODEL
CT-909 (Ch. NMX-12A)

FOLDER 1



CABINET—REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Disconnect antenna leads, remove ten screws holding cabinet back and remove back. Remove knobs from cabinet front. Disconnect CRT socket, HV anode, degaussing coil connector (DEG), deflection yoke connector (DY), speaker connector (A2) and ground wires. Remove two screws holding upper control bracket to cabinet top, four screws holding tuner assembly to cabinet front and remove control bracket and tuner assembly from cabinet and slide main chassis back and out of cabinet.

CRT REMOVAL

Follow chassis removal procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies. Remove four nuts holding degaussing coil shield and CRT, lift shield and CRT out of cabinet. Do not lift CRT by the neck.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A 1.5-amp fuse is used for low-voltage power-supply protection. (See photo, Cabinet - Rear View.)

A 4-amp fuse is used for AC line protection. (See photo, Cabinet - Rear View.)

VHF TUNER

The fine tuning mechanically engages oscillator slug for adjustment (one slug for each channel).

UHF TUNER

The UHF tuner employs a detent mechanism for channel selection. Fine tuning is adjusted by rotating the fine tuning knob.

HORIZONTAL OSCILLATOR

Adjustment of the horizontal hold is accomplished by the proper setting of the horiz hold control. (See Placement Chart.)

HIGH VOLTAGE

For adjustment of the high voltage, refer to Miscellaneous Adjustments.

FOCUS

The focus may be varied by a focus control. (See photo, Cabinet - Rear View.)

AGC

The AGC may be varied by an RF AGC control. (See Placement Chart.)